CHAPTER 2 – PROPOSED ACTION AND ALTERNATIVES

2.1 ALTERNATIVE 1 – PROPOSED ACTION

RDG operators anticipate the possibility of drilling up to 423 gas production wells in the RDG Project Area over the next 10–20 years (Map 2-1). The wells would be drilled at a rate of 15–40 a year until the resource is fully developed. The total number of wells drilled would depend largely on factors out of the group's control, such as geologic, economic, and environmental factors. A typical production life for a gas well is approximately 20 years; therefore, the life of the project could be as long as 40 years if wells are drilled at slower rates. The wells would be drilled on a spacing (subsurface production) pattern based on geology and reservoir qualities. Some areas could be developed on a 40-acre spacing pattern, while others could be drilled on spacing patterns of 160 acres or larger. It is anticipated that 40-acre well spacing would only be applied in areas of high natural gas production (areas of concentration development). The Wasatch Formation (average depth of 2,000–4,000 feet) and Mesaverde Formation (average depth of 4,000–6,000 feet) are the primary producing horizons in this area, but wells to the Dakota and Weber Sandstones (average depth of 7,000–10,000^{+} feet) would probably also be drilled.

The existing road network would be used to the maximum extent practicable to access new wells in order to minimize surface disturbance. All construction and oil and gas drilling and production operations would be managed within the guidelines and regulations of the BLM, as well as state and county agencies (see Tables 1-1 and 1-2).

The following sections describe the infrastructure and facilities that would be required for the project, including the plan of development; operational requirements; hazardous materials management; expected land, water, equipment, and employment requirements; abandonment and reclamation procedures; and additional BMPs to help mitigate potential environmental impacts.

2.1.1 TRANSPORTATION PLAN

After consultation with the BLM, RDG operators developed a conceptual transportation plan as part of its Proposed Action (Map 2-1). In general, the selection of access routes to proposed new well pads is designed to:

- maximize use of the existing road network;
- minimize the number of loop roads;
- minimize road construction on slopes greater than 40% (see Map 2-4);
- minimize profile grades;
- minimize crossings of drainages; and
- minimize the visibility of proposed roads from the Goblin City View Point.

The BLM authorizing officer (AO) would determine the exact location of proposed access routes during the on-site inspection by industry and the BLM.

2.1.2 CONSTRUCTION OPERATIONS

As a standard part of the APD process, the BLM and RDG operators would conduct an on-site inspection of each new wellsite. The objective of the on-site inspection would be to review the Surface Use Plan of Operations (SUPO), including the well pad location and its related access road for considerations of topography; topsoil/subsoil stockpiles; natural drainage and erosion control; flora, fauna, and habitat; historical, cultural, and paleontological resources; and any other surface issues that may become apparent during the on-site inspection. This on-site inspection also could be attended by specialists in the fields of archaeology, paleontology, biology, botany, or other fields, as may be appropriate to the particular site.

Once the APD is approved, wellsite construction would consist of leveling a rectangular pad of approximately 275 × 150 feet, occupying approximately 0.95 acre. The deeper wells into the Dakota and Weber Sandstones would require a pad with dimensions of 325 × 160 feet, or approximately 1.19 acres. Each well pad would be constructed from the native sand, soil, and rock materials present. No gravel, concrete, or other foreign materials would be brought in for use in construction of well pads. Construction would involve preparing a level area for the equipment that would drill and complete the well. First, vegetation on the pad would be cleared. Topsoil would be stripped to a depth determined by the BLM, stockpiled adjacent to the well pad, and maintained for future use in reclaiming the location. Afterward, the pad would be graded using standard, cut-and-fill techniques of construction using a bulldozer, grader, front-end loader, or backhoe. A small reserve pit (80 × 40 × 8 feet deep, approximately 0.07 acre) would be excavated adjacent to the level pad using heavy equipment or blasting, if necessary, to construct in bedrock. Deeper wells drilled into the Dakota and Weber Sandstone would require a larger reserve pit (180 × 50 × 10 feet, approximately 0.21 acre). Stockpiles for both topsoil and subsoil would generally occupy approximately 0.10 acre but also would depend on the amount of cut-and-fill required to level each site. Backfill for the reserve pits and spoil stockpile would occupy an area adjacent to the pits of approximately 0.30 acre. A small flare pit (10 × 10 feet) would also be constructed no less than 100 feet from the wellhead. To contain all facilities necessary for one well, the maximum size well location would be 1.80 acres. Therefore, the maximum surface disturbance from wellsites at full-proposed development would be approximately 760 acres.

Based on the existing road network and the conceptual transportation plan, approximately 125 miles of new roads (an average of 0.3 miles of new road per well) would be constructed. Road density is expected to range from approximately 1.2 miles per square mile to 4.8 miles per square mile, assuming that there would be a range of 4–16 wells per square mile. Assuming a road ROW width of 30 feet, total disturbance from construction of new roads would be approximately 459 acres for the maximum 423-well drilling project.

Access roads would be constructed using standard equipment and techniques. Heavy equipment, such as bulldozers and road graders would clear vegetation and topsoil materials from the road surface. All roads would be constructed with appropriate, adequate drainage and erosion control features/structures (e.g., cut and fill slope and drainage ditch stabilization, relief and drainage culverts, water bars and wing ditches similar to those identified in the BLM/USFS Surface Operating Standards for Oil and Gas Development (BLM and USFS 1989) as determined by

BLM through analysis of individual applications. If a well is not completed successfully and is plugged, the road would be reclaimed.

Based on the above specifications, the total initial surface disturbance to complete the project (including the maximum planned well pads and new roads) would be approximately 1,219 acres. Following the drilling and initial completion operations, a portion of each well pad plus its reserve pit would no longer be needed. These areas, averaging approximately 0.84 acre per well pad (see Figure 2-2), would be rehabilitated in accordance with existing oil and gas regulations. Successful reclamation of these areas would reduce the project life disturbance to 406 acres, or approximately 0.96 acres per well (0.96 × 423). Therefore, at this stage, total road and wellsite surface disturbances would be approximately 865 acres.

If a well is determined to be a dry hole, it would be plugged and abandoned (P&A) in accordance with applicable regulations, and the entire well location and its access road would be promptly reclaimed. No P&A procedures would take place without the prior notice and approval from BLM and state authorities.

2.1.3 SEISMIC OPERATIONS

To better evaluate geological potential, RDG operators propose using 2D or 3D seismic acquisition methods, such as vibraseis or shot points, as appropriate, to complement the existing seismic database. These methods detect subsurface geologic information by producing, at or near the surface, a source wave that bounces off subsurface layers. The seismic reflections are recorded with seismometers or geophones, which are very similar to microphones. The data collected are then processed and computer-enhanced to present the subsurface reflections in a graphic form, called a seismic section (2D) or volume (3D).

Seismic operations would be performed along existing roads and trails, as well as other adjacent lands. Based on seismic operations conducted previously in similar areas, minimal surface disturbance would occur. For a shot hole explosive seismic source, truck-mounted drilling rigs work on the seismic line. For the vibraseis method, special trucks that vibrate the ground are used to input source energy. Geophones are usually laid out by personnel on foot, in arrays, in precise locations. After seismic data are recorded, the geophone crews pick up all geophones and cables and clean up the seismic line.

Seismic operations would be rare. Such operations would be considered on a case-by-case basis and require appropriate environmental assessment and documentation.

2.1.4 DRILLING OPERATIONS

The drilling operation would be conducted in two phases. The first phase would use a small rig to drill to a minimum depth of approximately 300 to 500 feet. If a freshwater aquifer were encountered, the surface casing hole would be drilled an additional 50 feet below the aquifer to protect it. In most cases the surface casing would extend 200 feet below the Birds Nest aquifer and would be cemented back to the surface. This additional portion of the hole would usually be drilled with air. The BLM would be notified within 24 hours if any aquifers were encountered.

This surface hole would be cased with steel casing and cemented in place completely from the bottom of the hole to the surface. This part of the drilling operation would normally take one to two days to complete.

A larger drilling rig would then be mobilized to drill the remainder of the hole to Total Depth (TD). Prior to drilling out below the surface casing, a Blowout Preventer (BOP) would be installed on the surface casing, and both the BOP and surface casing would be tested for pressure integrity. A typical drill rig diagram is depicted on Figure 2-1.

In order to achieve borehole stability and minimize possible damage to the hydrocarbon producing formations, a low-solids, non-dispersed mud system would be used at a depth deemed necessary by the on-site personnel. This is a freshwater system and consists mainly of bentonite and non-hazardous additives. No chromates would be mixed with the drilling fluid. A list of chemicals and materials used in the drilling of a typical well is provided in Table 2-1.

All operations would be conducted in accordance with the minimum standards for casing and cementing, as specified in Federal Onshore Order #2 and current Utah Division of Oil, Gas, and Mining regulations (both incorporated herein by reference per CEQ Regulations [40 CFR § 1502.21]).

A water recycling system would be employed to continuously process the drilling fluid. By utilizing this system, the total water requirement to support the drilling operation for each well would be reduced by 50–65%, to approximately 2,500 barrels (1/3 acre-foot). If difficult lost-circulation areas were encountered, an air system would be used to assist the fluid system.

Operation water for drilling would come primarily from a flowing water well owned by Rosewood, located in the SE1/4 of Sec. 13 of T11S, R23E. RDG operators would use up to 20 acre-feet annually from this well. An additional 5 acre-feet of water has been secured through a local water supply contractor who holds a surface water right (No. 49-1606 from the Utah State Engineer's Office) for annual withdrawals of up to 5 acre-feet from Evacuation Creek. Additional water needs above the 25 acre-feet per year of water that these sources provide would be satisfied by using water from the four flowing water wells identified on Map 3-1. Project proponents have primary water rights from these sources. Total water use for drilling over the life of this project is estimated at approximately 140 acre-feet.

The reserve pit would be used to receive the drill cuttings (Figure 2-1). A secondary purpose of the reserve pit would be to contain drilling fluids. No hazardous substances would be placed in this pit. RDG operators do not plan to use synthetic liners in the drilling program unless required by the land managing agency.

Upon drilling the hole to TD, the well would be evaluated. If adequate hydrocarbon resources are present and recoverable, then steel production casing would be run and cemented in place in accordance with the well design, as approved by the land managing agency and any applicable approval conditions. The casing and cementing program would be designed to isolate and protect the various formations encountered in the wellbore to prohibit communication or fluid migration between zones. It would take 5-10 days to perform this phase of the drilling operation.

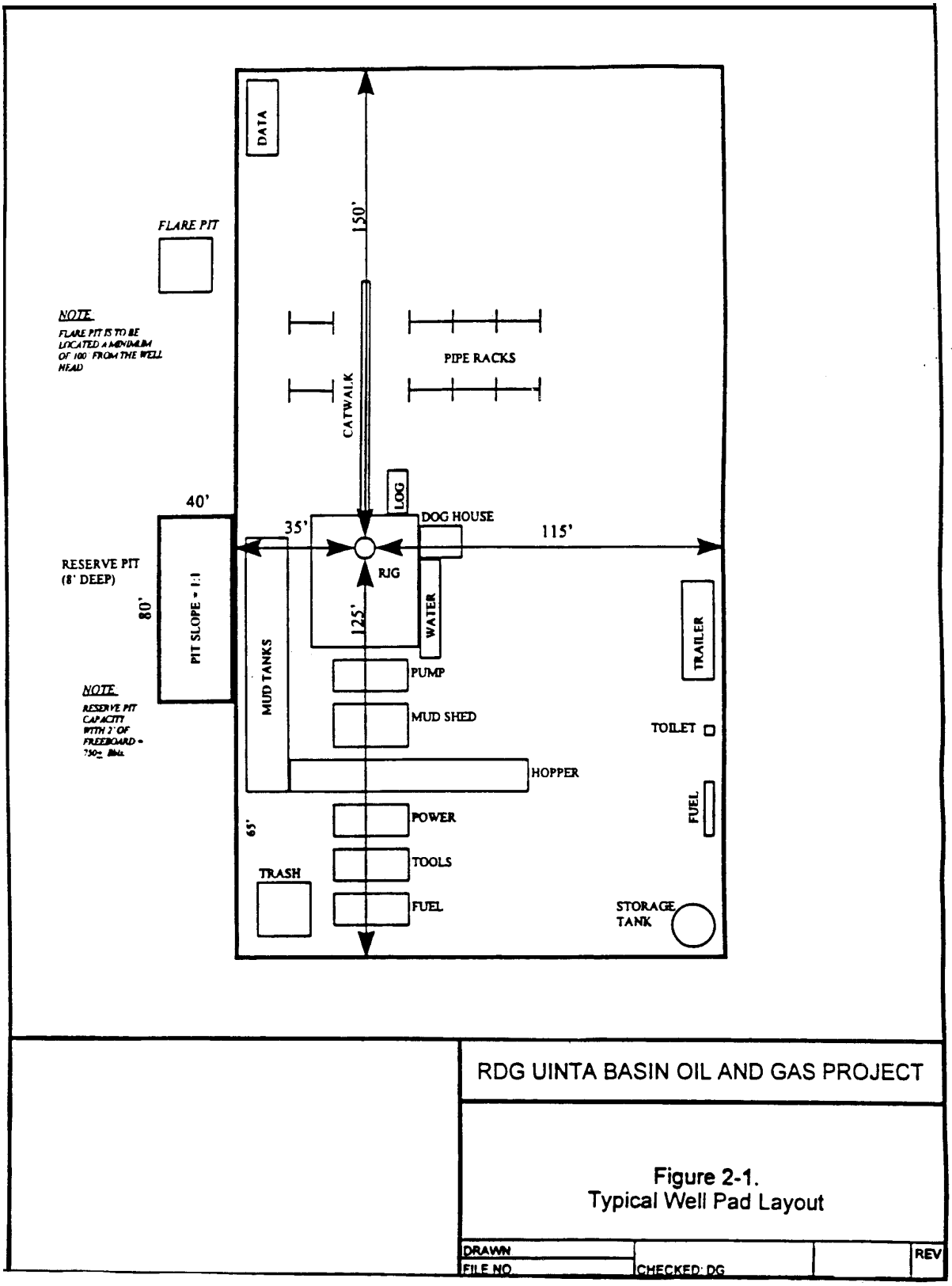

Figure 2-1. Typical well pad layout.

Table 2-1. Materials Used for Each Well during Drilling Operations

Item	Use	Average Quantity Used Per Well	Hazardous Material (HM) or Hazardous Substance (HS) Contained[1]	Is or Contains EHSs[2]
Bentonite	Viscosifier/Flocculator	20,000 lb	None	None
Sodium chloride (NaCl)	Chloride	33,000 lb	None	None
Sodium hydroxide (caustic soda)	pH control	1,000 lb	HS: Sodium hydroxide	None
Diammonium phosphate	Clay stabilizer	24,000 lb	None	None
"Soap"	Foamer for air drilling	110 gal	None	None
AM-552-K (organic terpolymer)	Corrosion control	250 gal	None	None
Diesel	Motor fuel while drilling	800 gal/day	HM: Yes HS: Benzene, Cumene, Toluene, Ethylbenzene, Xylene, Methyl tertbutyl ether, Polynuclear aromatic compounds	None
Pipe joint compound	Lubricate pipe threads	100 lb	HM: No Grease, Oil, Talc, Lime	None

[1] As listed in EPA's Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986, as amended, including petroleum products ("oil") per Clean Water Act (CWA). Materials used include regulated "Hazardous Materials" that in some cases contain "Hazardous Substances" and in some cases do not. "HM" indicates a material is a Hazardous Material regulated under one or more programs. If Hazardous Substances "HS" are included as a component of that material, they are indicated as "HS."

[2] "Extremely Hazardous Substances" as defined in 40 CFR 355.

2.1.5 COMPLETION OPERATIONS

Once production casing has been cemented in place, the drilling rig would be released and a completion rig would be moved in. Well completions vary from area to area. Some wells would require the typical stimulation treatment of the area, hydraulic fracturing, whereby a slurry of sand suspended in a viscous fluid (gelled water) is pumped into the producing formation with sufficient hydraulic horsepower to fracture the rock formation. The typical completion operation uses approximately 300 barrels of water (0.038 acre-foot) and would take 3–15 days to perform.

Table 2-2 provides a list of chemicals and materials typically used during well completion. Fracturing fluids would at all times be confined to storage tanks while on-site, and any excess would be subsequently recycled or transported to a licensed commercial disposal facility.

Table 2-2. Materials Used for Each Well during Completion Operations

Item	Use	Average Quantity Used Per Well	Hazardous Material (HM) or Hazardous Substance (HS) Contained[1]	Is or Contains EHSs[2]
Foaming agent	Fracturing	160 gal	None	None
pH control	Fracturing	25 gal	None	None
Gel breakers	Fracturing	80 lb	None	None
Buffering agents	Fracturing	5 gal	None	None
Crosslinker	Fracturing	4 gal	None	None
Clay control	Fracturing	79 gal	None	None
20/40 mesh sand	Fracturing	250,000 lb	None	None
Gelling agents	Fracturing	550 gal	None	None
Surfactants	Fracturing	160 gal	HS: Methanol (5%)	None
Enzyme breakers	Fracturing	185 lb	None	None
Microbiocides	Fracturing	40 lb	None	None
Radionuclides	Fracturing	less than 10 lb	None	None
Carbon dioxide	Fracturing	100,000 lb	None	None
Potassium chloride	Fracturing	unknown	None	None
Hydrochloric acid	Acidizing	1,000 gal	HS: Hydrochloric acid	None
Acetic acid	Acidizing	80 gal	HM: Acetic acid	None
Clay control	Acidizing	1 gal	None	None
Surfactant	Acidizing	2 gal	None	None
Corrosion inhibitor	Acidizing	3 gal	HS: Formaldehyde (3%) HS: Methanol (9%)	None
Iron control	Acidizing	5 lb	None	None
Portland cement	Cementing	Unknown	None	None
Bentonite	Cementing	Unknown	None	None
Gypsum	Cementing	Unknown	None	None
Dispersant	Cementing	Unknown	None	None
Retarder	Cementing	Unknown	None	None
Calcium chloride	Cementing	Unknown	None	None
Gilsonite	Cementing	Unknown	None	None
Cellophane flakes	Cementing	Unknown	None	None
Antifoaming agents	Cementing	Unknown	None	None

Table 2-2. Materials Used for Each Well during Completion Operations

Item	Use	Average Quantity Used Per Well	Hazardous Material (HM) or Hazardous Substance (HS) Contained[1]	Is or Contains EHSs[2]
Fluid loss additives	Cementing	Unknown	None	None
Granulated salt	Cementing	Unknown	None	None

[1] As listed in EPA's Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986, as amended, including petroleum products ("oil") per Clean Water Act (CWA). Materials used include regulated "Hazardous Materials" that in some cases contain "Hazardous Substances" and in some cases do not. "HM" indicates a material is a Hazardous Material regulated under one or more programs. If Hazardous Substances "HS" are included as a component of that material, they are indicated as "HS."

[2] "Extremely Hazardous Substances" as defined in 40 CFR 355.

2.1.6 PRODUCTION OPERATIONS

Wells that are successfully completed as producing wells would be equipped with gas production units to separate gas and liquids. Wells would be equipped with storage tanks (typically 210 barrels) for the collection of condensate and water. The storage facilities will have a containment dike with sufficient volume to contain the entire content of the largest tank within the facility/battery. Produced water would be transported from the wellsite to a disposal well in Sec. 15 of T11S, R23E, within the RDG Project Area, or to a licensed commercial disposal facility. Blowdown lines would be installed, as necessary, for pressure release into tanks where water would be produced. In some instances, pumping units powered by lease gas would be installed to remove wellbore fluids. Table 2-3 provides a list of chemicals and materials typically used during well production.

A schematic of a typical production facility is provided in Figure 2-2. RDG operators would prepare and submit to the BLM a schematic site security diagram for production sites and adhere to all site security regulations for wells on land under federal jurisdiction pursuant to Onshore Oil and Gas Order No. 3.

Produced natural gas would be sold. Gas gathering lines would be integrated into the existing gas pipeline gathering and transmission network (see Map 2-1). The gas lines would vary from 2-inch to 10-inch, unpainted steel pipe and would be laid on the surface, adjacent to access roads.

Pipeline construction would use a backhoe to string pipe and a welding truck to make connections. Soils would be left undisturbed over much of the construction work area, although some compaction may occur. Before being placed into service, all pipelines would be tested with pressurized fresh water (hydrostatic testing) or air to locate any leaks. After completion of hydrostatic testing, wastewater would be hauled to disposal facilities.

One 350-horsepower compressor is proposed. Compressor station locations are unknown, but an estimated location has been identified for analysis purposes (see Map 2-1).

Table 2-3. Materials Used or Produced for Each Well during Production Operations

Item	Use	Average Quantity Per Well	Hazardous Material (HM) or Hazardous Substance (HS) Contained[1]	Is or Contains EHSs[2]
Diesel	Engine fuel	300 gal	HM: Yes HS: Benzene, Cumene, Toluene, Ethylbenzene, Xylene, Methyl tertbutyl ether, Polynuclear aromatic compounds	None
Ethylene glycol	Coolant/ Dehydration	100 gal	HS: Ethylene glycol	None
Methanol	Dehydration	100 gal	HS: Methanol	None
Unleaded gasoline	Engine fuel	840 gal	HM: Yes HS: Benzene, Cumene, Toluene, Ethylbenzene, Xylene, Methyl tertbutyl ether, Polynuclear aromatic compounds	None
Natural gas	Produced product	100-250 mscf/day (3)	HM: None	None
Natural gas condensate	Produced product	0-600 gal	HM: Benzene, Hexane	None
Produced water	Produced product	0.5-1.0 bbl/day	None	None
Paint (various types)	Facility maintenance	150 gal	HS: Lead compounds, Cobalt compounds, Manganese compounds, Ethanol, Sulfuric acid, Barium compounds, Polynuclear aromatic compounds	None
Grease and lubrication oil	Lubrication	Unknown	HM: Generally no HS: Zinc compounds, Copper compounds, Polynuclear aromatic hydrocarbons	None
Hydraulic oil	Hydraulic fluid	Unknown	HM: No	None
Propane	Fuel	500 gal	HM: Yes	None

[1]As listed in EPA's Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986, as amended including petroleum products ("oil") per Clean Water Act (CWA). Materials used include regulated "Hazardous Materials" that in some cases contain "Hazardous Substances" and in some cases do not. "HM" indicates a material is a Hazardous Material regulated under one or more programs. If Hazardous Substances "HS" are included as a component of that material, they are indicated as "HS."

[2]"Extremely Hazardous Substances" as defined in 40 CFR 355.

[3]Thousand standard cubic feet per day.

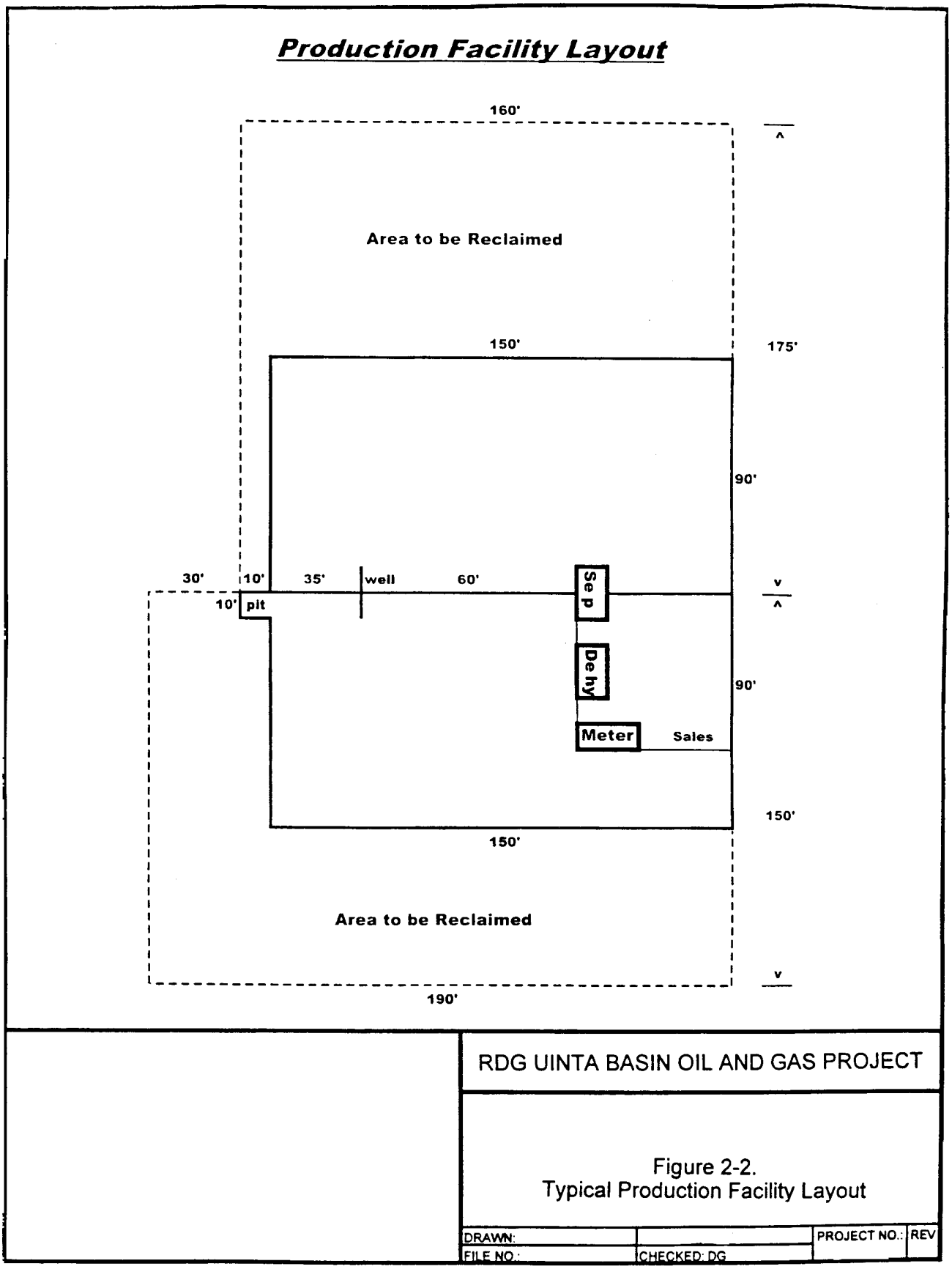

Figure 2-2. Typical production facility layout.

2.1.7 WORKOVER OPERATIONS

Workovers would be required from time to time to repair or replace downhole equipment, maintain existing production rates, or to recomplete the well to enhance productivity. Workovers performed by completion rigs typically would take one to two days for routine repairs and one to ten days for recompletion. Operations would be similar to those described in Section 2.1.5.

2.1.8 ABANDONMENT AND RECLAMATION

Prior to abandonment of any well (whether dry hole or depleted producer), location, access road, or other facility on BLM land, operators would request approval from BLM. After approval, wellbores would be plugged with cement, as necessary, to prevent fluid or pressure migration and to protect and isolate mineral and/or water resources. Wellheads would be removed, both the surface casing and production casing would be cut off below ground level, and an appropriate marker plate would be set level with the ground surface in compliance with federal and state regulations. Abandonment of state wells would be in accordance with state regulations. Well plugging typically takes up to two days to complete.

The well pad, reserve pit, and access road would be reclaimed according to the BLM guidelines. At a minimum, this would include backfilling the pit, recontouring the surface to blend in the site with the natural surroundings, and redistributing the topsoil. All surfaces disturbed would then be seeded with a mixture of native grass and plant species, per the BLM and state of Utah requirements specified in the APD approval.

2.1.9 WASTE CONTROLS

A variety of wastes, including drilling solids, waste oils, waste parts, various solid wastes, and sanitary wastes, would be produced during the construction, drilling, and production phases of the operation. All wastes would be recycled or disposed of in accordance with applicable laws and regulations.

Solids, or cuttings, would be produced during the drilling stage. The solids are bits or rock produced by the drill bit cutting through the earth. They would be buried in the drilling pit after fluids in the pit, such as water, treatment fluids, and fracturing fluids, have been evaporated or pumped into trucks and transported to approved disposal facilities. Any pit liners used would be broken up and buried in the reserve pit.

Empty steel and plastic drums that would contain materials such as caustic sodas, acid, lubricating oil and drilling additives would be recycled or disposed appropriately by transporting to approved facilities.

Various solid wastes (such as empty sacks, spent filters, and cleaning rags generated during drilling, completion, production, and workover operations) would be contained and disposed of in approved disposal facilities, including regional landfills. Sanitary wastes would be collected in portable toilets located on well pads during drilling. The contractor would regularly pump these

toilets and appropriately dispose of the wastes. The toilets would be removed when drilling is completed.

Ethylene glycol would be used during production operations in a closed system as a treatment for removing water from the gas stream. As necessary, ethylene glycol would be replaced with fresh fluids due to excessive accumulation of contaminants. Spent fluids would be stored on location in drums and eventually removed to approved disposal facilities.

2.1.10 HAZARDOUS MATERIALS

Each of the RDG operators would maintain Spill Prevention, Control, and Countermeasure Plans for each wellsite within their respective lease areas. Plans for each additional well would be added as development proceeds. These plans address both the management of petroleum products, as required under the Clean Water Act, and hazardous chemicals and hazardous substances. These plans and each operator's Environmental Policy, Procedures, and Guidelines Manual would be accessible at their local offices.

Each operator would maintain current Material Safety Data Sheets (MSDS) for all chemicals, compounds, and/or substances that would be used during construction, drilling, completion, production, and gas gathering operations in the RDG Project Area. Operators have reviewed the U.S. Environmental Protection Agency's (EPA's) *Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986*, as amended, including specific chemicals and categories of chemicals/materials, to identify any hazardous materials proposed for use in this project. Substances and materials categorized as hazardous that would be used in this project are presented in Tables 2-1, 2-2, and 2-3.

As described in Sections 2.1.4, Drilling Operations; 2.1.5, Completion Operations; and 2.1.6, Production Operations; RDG operators and their contractors would locate, handle, and store hazardous materials in a manner that prevents them from contaminating soil and water resources or other sensitive environments. Any release of hazardous substances (e.g., leaks, spills, etc.) in excess of the reportable quantity as established by 40 CFR 302 (for hazardous substances) and 40 CFR 117 (for petroleum products) would be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA), and the Clean Water Act, as amended, respectively. If the release of a hazardous substance in a reportable quantity occurs, a copy of the report would be furnished to the BLM and all other appropriate federal and state agencies. Additionally, spills and releases of any materials on federal leases require reporting to the BLM, according to Notice to Lessees 3A, Reporting of Undesirable Events.

RDG operators anticipate that no hazardous chemicals in excess of 10,000 pounds would be used, produced, stored, transported, or disposed of annually in association with the drilling, completion, or production of any well. In addition, no extremely hazardous substance (as defined in 40 CFR 355) in amounts greater than threshold planning quantities would be used, produced, stored, transported, or disposed of in association with the production of any well.

2.1.11 WORKFORCE REQUIREMENTS

Most of the workforce personnel used in developing the Proposed Action would be involved in construction, drilling and completion operations. After roads and well pads are constructed, wells are drilled and completed, and pipelines are installed, minimal personnel would be required to operate the field. Transport of workers and equipment would generally be from Vernal or Roosevelt, Utah. Table 2-4 shows estimated employment requirements for the project.

Table 2-4. Estimated Workforce Requirements for 423 Wells[1]

Employment Category	Worker-days per Well[2]	Total Worker-years for Project[3]
Well Construction and Development		
Construction	15	24
Drilling (15 days × 7 people × 3 shifts)	315	512
Completion	114	185
Operations and Maintenance		
Production (10 years)	685	930
Workovers (every 3 years)	36	49
Abandonment (Reclamation)	50	81
Total	1,215	1,781

[1]Assuming that 362 wells are drilled and completed as producers and 61 wells are drilled and abandoned as dry.

[2] For a producing well

[3] 260 worker-days = 1 worker-year. Totals have been adjusted to account for non-producing wells.

2.1.11.1 CONSTRUCTION OPERATIONS

Project construction requires a variety of equipment and personnel. Construction of the drill site and any access roads would require three to five employees and operation of two bulldozers, one backhoe, a front-end loader, and road grader, for four working days, approximately 12 hours per day. Approximately five round trips to transport heavy equipment and eight round trips to transport workers would be necessary for each well.

2.1.11.2 DRILLING OPERATIONS

During drill site preparation, approximately 15 semi-truck trips (5 trucks making multiple trips) would be required over a 24–36-hour period to haul the drilling rig and other equipment to a well location. An additional 10 trips (per 24-hour period) by passenger vehicle could be necessary to convey personnel to the site. Once drilling is complete, another 15 semi-truck trips and 10 passenger-vehicle truck trips would be used to move the rig, equipment, and personnel to another site.

Typically, it takes 5–10 days to drill a well in the area. Drilling would be a 24-hour operation, using two crews each working a 12-hour shift. There could be approximately 10 trips during each 24-hour period by passenger vehicles or larger trucks during each 24-hour period. On the average, there would be 75 round trips per well.

2.1.11.3 COMPLETION OPERATIONS

Converting a well from drilling to production could take 3–15 days. This would mean an average of 9 round trips of 4 passenger vehicles to transport approximately 12 personnel. Necessary equipment could include a truck-mounted drilling rig, a sand truck, a pump truck, a fracture (or frac) tank, a tanker truck, a wireline unit, and a production equipment truck; these vehicles would make one round trip each.

2.1.11.4 PIPELINE CONSTRUCTION

On average, it would take 1.0–1.5 days per well to install surface pipelines for each well. Equipment requirements would include a welding truck, a backhoe, two passenger vehicles, and hydrostatic testing equipment. Approximately six workers per well would be used during pipeline construction.

2.1.11.5 WELL MAINTENANCE

A maintenance person ("pumper") would visit each well daily during production to monitor well operations. One pumper is generally responsible for 30 wells. At full production, 12 pumpers would be employed to visit the 362 producing wells (as noted in Table 2-4).

Periodically, a well would require a workover to ensure that the well is maintained in good condition and is capable of extracting gas efficiently. A workover would utilize a truck-mounted unit, similar to that used for well completion. Routine repairs would be completed typically in one day, involving one round trip for the rig and two round trips for support and transport vehicles. More detailed workovers could take up to five days to complete. Although the frequency of workovers cannot be predicted, each well would likely require biannual workovers.

2.1.11.6 PLUGGING AND ABANDONMENT (P&A) OPERATIONS

Dry holes (unsuccessful wells) would be plugged using the drilling rig, a process that would generally be completed in one day. A depleted production well would be plugged using a truck-mounted workover rig; this process would take two days to complete, involving one round trip. Two trucks to transport personnel and equipment (two round trips) would also be used.

Surface reclamation of wellsites and access roads would take approximately five days, and would involve dismantling equipment and completing dirt work. Approximately four personnel (five round trips) would be necessary. A truck to transport production equipment, a bulldozer, and a backhoe/front-end loader (in three round trips) would also be used.

2.1.12 BEST MANAGEMENT PRACTICES

BMPs are practices currently identified by the BLM in Washington Office Instruction Memorandum No. 2004-194 (6/22/05) and defined as "innovative, dynamic, and economically feasible mitigation measures applied on a site-specific basis to reduce, prevent, or avoid adverse environmental or social impacts."

BLM Instruction Memorandum No. 2004-194 requires BLM field offices to incorporate BMPs into APDs and associated on- and off-lease ROWs after appropriate NEPA evaluation. This is done in two ways. Some BMPs are to be considered in nearly all circumstances. The other BMPs are to be considered on a case-by-case basis. The alternatives considered in this EIS incorporate many of these BMPs.

The BMPs to be applied in all cases and incorporated into the Conditions of Approval (COA) of the ROD are as follows:

- interim reclamation of a well's location and access roads soon after the well is put into production;
- the painting of all new facilities in a color that best allows the facility to blend with the background (typically a vegetated background);
- design and construction of all new roads to a "safe and appropriate" standard (i.e., "no higher than necessary" to accommodate their intended use); and
- final reclamation recontouring of all disturbed areas, including access roads, to the original contour or a contour that blends with the surrounding topography.

Case-by-case BMPs for this project include (but are not limited to) the following:

- installation of raptor perch avoidance;
- burying of distribution power lines and/or flow lines in or adjacent to access roads;
- centralization of production facilities;
- use of submersible pumps;
- use of belowground well heads;
- drilling of multiple wells from a single pad;
- wildlife monitoring;
- seasonal restriction of public vehicle access;
- avoiding placement of production facilities on hilltops and ridgelines;
- screening facilities from view;
- bioremediation of oil field wastes and spills; and
- use of common utility or ROW corridors.

2.1.13 ADDITIONAL BMPS

In addition to the national BMPs, the VFO of the BLM, operators in the Uinta Basin, and Uintah County officials are cooperatively developing a comprehensive list of additional BMPs specific to oil and gas operations in the Uinta Basin. The objective of this cooperative effort is to apply those additional BMPs to individual wells on a case-by-case basis to demonstrate effectiveness in the field and to facilitate their application to future operations in the Uinta Basin.

Based on preliminary data from over 50 years of oil and gas operations in the Uinta Basin, the final list of additional BMPs is expected to include more than 100 measures that could be considered and evaluated on a case-by-case basis.

Described below are several BMPs that could be implemented by RDG operators to reduce the potential environmental impacts of the proposed development activity. The following measures apply to all federal lands within the RDG Project Area. These additional BMPs have been analyzed as part of each alternative and may be required in the COA. The BLM would coordinate with the state regarding split-estate issues on a case-by-case basis to consider implementing these measures on state lands.

2.1.13.1 CULTURAL RESOURCES

A BLM-approved archaeologist should conduct a Class III pedestrian survey of all well pad sites and access roads proposed for surface disturbance prior to beginning construction. RDG operators should avoid any cultural resources or historic properties found in the Project Area that are recommended or determined to be eligible for the NRHP by adjusting facility locations or mitigating, monitoring, or salvaging. Construction personnel should be informed of the potential to encounter cultural resources during construction operations. If cultural resources are discovered during surface disturbance, operations that could further damage the resource will be suspended. The BLM's AO will be contacted, and arrangements made to determine the discovery's significance and, if necessary, to mitigate or avoid it. Mitigation will be appropriate to the scope of the project, the nature of the resource at risk, and adherence to the provisions of 36 CFR 800 and other regulatory guidelines. Consultation with other interested parties will occur per regulation. Data collected during mitigation shall be placed in an approved repository.

2.1.13.2 PALEONTOLOGICAL RESOURCES

Prior to surface disturbance and as determined by the BLM AO, paleontology surveys will be conducted on site-specific applications.

If vertebrate fossils are discovered during surface disturbance, construction personnel should be informed, and operations that could further damage the resource should be suspended. The BLM's AO should be contacted, and arrangements should be made to determine the discovery's significance and, if necessary, to mitigate or avoid it. Fossils and data collected during mitigation should be placed in an approved repository. Construction workers should be instructed in cautious treatment of these resources and educated to understand that vandalism and/or theft of such resources will not be tolerated.

2.1.13.3 BITTER CREEK FLOODPLAIN

No well pads should be developed within the designated 100-year floodplain of Bitter Creek.

2.1.13.4 BIOLOGICAL RESOURCES

Where the BLM's AO deems necessary, well pad sites and access roads should be examined by a BLM or BLM-approved wildlife biologist and botanist to determine if any state or federally listed animal or plant species are present at the site. If present, efforts would be made to avoid such resources by relocating well pads or access roads. Site-specific clearances for state or federally listed species would be performed during the APD on-site review.

A 1:1-acre mitigation ratio would be established for every acre of disturbance within browse habitat on 12,785 acres of BCRMP-identified crucial mule deer winter range. This disturbance ratio is based on the mitigation limits imposed by the BCRMP. If on-site mitigation were deemed to be inadequate within the BCRMP crucial winter range, RDG operators would be encouraged to perform off-site mitigation within the UDWR-identified critical deer winter range.

Federal Onshore Order No. 2 requires that all usable waters (i.e., waters with <10,000 mg/L total dissolved solids [TDS]) be isolated and protected in the wellbore via cementing the production casing in place. According to Federal Onshore Order No. 2, all water encountered should be reported to the BLM when encountered during drilling operations; recovered water should be tested for water quality and major cations and anions; and amounts and rates of water flow should be reported.

2.1.13.5 SAGE GROUSE

Where sage grouse habitat has been identified in the RDG Project Area (Section 1 and the northern half of Section 12, T11S, R22E) no surface disturbing activities should occur during the breeding and nesting season (March 15 to June 15). RDG operators should avoid year-round surface disturbance within 300 feet of identified sage grouse strutting grounds.

2.1.13.6 EROSION CONTROL

Erosion control for surface disturbances from grading of wellsites and access roads should consist of building sediment retention structures down-gradient from these facilities on an as-needed basis. Grading of well pads and roads should direct drainage away from established watercourses. RDG operators should construct sediment basins to retain sediment from construction of multiple wells and their associated access roads. Sediment basins would be sized based on slope, soil permeability, and land cover type to hold runoff resulting from a 25-year, 6-hour storm event.

2.1.13.7 VISUAL RESOURCES

As required by the AO, operating equipment on all lands contained within the RDG Project Area (including state lands) should be painted in a flat, non-reflective color that is compatible with the

surrounding landscape. Operators should consult with the BLM, during the on-site inspection, on the use of topographic and vegetative screening to locate wells in order to minimize visual impacts.

2.1.13.8 AIR QUALITY

Chemical dust suppressants and water should be applied as needed to minimize fugitive particulate emissions and entrained dust during construction of access roads and during drilling operations at well pads. Furthermore, any combustion sources, mobile or stationary, used during the construction phase of this project should be kept in good working condition.

2.2 ALTERNATIVE 2 – ADDITIONAL WILDLIFE CONSIDERATIONS

This alternative was developed in response to issues raised during the public and agency scoping process and includes additional mitigation measures on BLM-administered lands to ensure that physical and biological resources within the Project Area receive greater protection, while allowing energy development activities to continue. This alternative incorporates the same construction and operational components as the Proposed Action. Under this alternative, 423 wells would be drilled, but additional BMPs may further affect the location of well pads, roads, or ancillary facilities within the lease or further restrict development during certain periods of the year to reduce potential environmental impacts. See Map 2-1 for a depiction of this alternative. The additional BMPs considered under this alternative are listed below.

2.2.1 ADDITIONAL BMPS

2.2.1.1 WATER RESOURCES

Blasting for well locations or geophysical operations within .25 mile of a spring or water well would be avoided.

2.2.1.2 SOILS/RIPARIAN

There would be no new surface-disturbing activities on slopes greater than 40%, which involves approximately 4,151 acres within the RDG Project Area (see Map 2-4). There may be roads proposed on slope grades up to 40% in order to access ridgetop well locations.

There would be no surface-disturbing activities in delineated riparian areas (see Map 2-5).

2.2.1.3 VEGETATION

Noxious weed infestations associated with wellsites, well facilities, roads, or ROWs constructed or improved for this project would be treated and controlled by the operators. Weed treatment protocols would be specified in the pesticide use permit approval process.

2.2.1.4 WILDLIFE

2.2.1.4.1 Deer

To protect wintering mule deer, no surface-disturbing, drilling, or completion activities would be allowed from January 1 to March 1 on BLM-administered lands identified in the BCRMP EIS as crucial deer winter range (BLM 1984) (see Map 2-6). Exceptions to this limitation in any year would be requested in writing and directed to the BLM AO. This restriction would not apply to the maintenance and operation of producing wells. The number of actual visits by personnel needed to monitor well operations during this period should be minimized.

A 1:1.5-acre mitigation ratio would be required for every acre of disturbance within browse habitat on 12,785 acres of BCRMP-identified crucial mule deer winter range. If on-site mitigation were deemed to be inadequate within the BCRMP crucial winter range, RDG operators would be encouraged to perform off-site mitigation within the UDWR-identified critical deer winter range.

2.2.1.4.2 Sage Grouse

Sage grouse BMPs are as follows:

- No surface-disturbing activities would be allowed within 1,000 feet of sage grouse strutting grounds (BLM 1994).
- No workover operations will be allowed from March 1 through June 30 without written approval from the AO.
- No power lines or electrical transmission lines that provide perch sites for raptors would be built within 2 miles (3 km) of sage grouse habitat. Transmission lines should be buried and power poles should be modified to prevent their use as raptor perches (Connelly et al. 2000).

2.2.1.4.3 Raptors

Raptor BMPs are as follows:

- No surface occupancy would be allowed within the recommended nesting constraint distances of an active nest (Table 2-5) unless proposed activities are topographically concealed from the active nest, or unless artificial nesting structures (ANSs) are constructed. If ANS mitigation is used, raptor ANSs should be constructed to allow raptors to switch from natural nesting sites to artificial ones. The ANSs should be in place at least two years prior to any development occurring within .25 mile of a natural nest to allow the raptors the opportunity to accept or reject the new structure.
- Raptors would be protected by restricting construction and ground-disturbing activities year-round within .5 mile of golden eagle nests that have been active within the past two years. However, surface-disturbing activities may be allowed within .25 mile of an active nest if a site-specific analysis determines that terrain features adequately protect the nest site from proposed surface-disturbing activities.

Table 2-5. Active Raptor Nest Distance and Timing Constraints

Species	Distance from Active Nest (miles)	Timing Constraints
Burrowing owl	0.5	April 1 – July 15
Swainson's hawk	0.5	April 1 – July 15
Northern goshawk	0.5	April 15 – August 20
Short-eared owl	0.5	April 10 – June 15
Prairie falcon	0.5	April 1 – July 15
Merlin	0.5	April 15 – June 25
American kestrel	0.5	May 1 – June 30
Turkey vulture	0.5	May 15 – August 15
Cooper's hawk	0.5	May 1 – August 15
Sharp-shinned hawk	0.5	June 20 – August 15
Northern harrier	0.5	April 1 – July 15
Red-tailed hawk	0.5	April 1 – July 15
Great-horned owl	0.5	February 1 – May 15
Long-eared owl	0.5	March 15 – June 15
Mexican spotted owl	1,000 acres NSO[1]	March 1 – August 1

[1] NSO – No Surface Occupancy.
Source: BLM 1994.

- Construction and ground-disturbing activity would be restricted year-round within .25 mile of ferruginous hawk and bald eagle nests. A site-specific analysis should be completed to determine if terrain features adequately protect the nest site from proposed ground-disturbing activity.
- Construction and ground-disturbing activity would be restricted year-round within 1 mile of known peregrine falcon nests (BLM 1994).
- No surface disturbing activities would be allowed within .5 mile of active burrowing owl nests between April 1 and July 15 (Table 2-5).
- These timing and distance restrictions would also be applied to workover rigs.
- Field personnel would be instructed to contact Division of Wildlife Resources of carcasses on state and county roads for removal. Distribution of carcasses off roadways would reduce the potential for raptor-vehicle collisions.
- The above spatial and timing restrictions would not apply if impacts can be mitigated through other management actions. A site-specific analysis should be completed to determine if terrain and/or topographical features adequately protect the nest site from proposed ground-disturbing activity (BLM 1994).

- To protect other raptor species' nest sites, no ground-disturbing activity would be allowed within .5 mile of an active nest during the specified timing constraints shown in Table 2-5.
- The BLM or a BLM-approved biologist should conduct site-specific field surveys for Mexican Spotted Owl (MSO) within the fair habitat identified within the RDG Project Area. The surveys shall be conducted according to USFWS protocol. If necessary, timing and/or other restrictions should be employed to provide MSO protection. Restrictions should be implemented after consultation with the USFWS.

2.2.1.4.4 Other

Important watering locations, such as guzzlers and free-flowing water wells, would be protected by restricting surface disturbing activities within .25 mile of these locations.

2.2.1.5 SPECIAL STATUS SPECIES

Surface disturbance in special status plant habitats would be avoided. Site-specific evaluations by the BLM may allow for a waiver, exception, or modification to this requirement.

2.2.1.6 RECREATION/VISUAL RESOURCES

Recreation and visual resource BMPs are as follows:

- Where topography permits, wellsites would be positioned to prevent "sky lining."
- Existing vegetation and topographic features would be used to screen wells, facilities, and roads from the viewshed within a 5-mile radius of the Goblin City Overlook (see Map 2-7).
- No construction, drilling, or completion operations would be allowed from May 15 to June 30 within the 5-mile viewshed of the Goblin City Overlook.
- Straight line-of-sight bulldozing would be avoided. Access roads should incorporate a reduced-contrast, curvilinear path design where practicable.

2.2.2 PRIMARY ELEMENTS COMPOSING ALTERNATIVE 2 – ADDITIONAL WILDLIFE CONSIDERATIONS

The primary elements composing this alternative are very similar to those of Alternative 1 – Proposed Action. The same construction, operational, and decommissioning/reclamation phases as those described for Alternative 1 would occur. However, if applied, the additional BMPs identified above for Alternative 2 would result in some differences from Alternative 1.

The locations of many wells and roads proposed under Alternative 1 could be moved or have timing restrictions implemented under Alternative 2.

- Approximately 73 wells and associated roads could be relocated to use existing vegetative and topographic screening within the viewshed of the Goblin City Overlook.

- A total of 5 wellsite locations could be affected by surface restrictions near important wildlife watering areas.
- Approximately 24 wells proposed near raptor nests could be affected by moving or timing restrictions.
- Timing and moving restrictions for sage grouse and burrowing owl habitat could affect 6 wells.
- Approximately 44 wells could be located in crucial deer winter range and be affected by timing restrictions.
- Finally, even though there are no wells proposed on slopes in excess of 40%, there may be roads proposed on slope grades up to 40% in order to access ridgetop well locations. These soils restrictions could affect approximately 4,150 acres of the RDG Project Area.

Note that there is some overlap in these environmental protection restrictions. Refer to Table 2-6 for a comparison of alternatives.

2.2.3 WORKFORCE AND CONSTRUCTION RESOURCE REQUIREMENTS

The requirements for constructing the facilities in this alternative are very similar to those identified for Alternative 1. As described under the Proposed Action, most of the active workforce involved in developing Alternative 2 would be involved in construction-related activities. All other construction, operation, and reclamation activities, as identified under the Proposed Action, would also occur under this alternative.

Table 2-6. Comparison of Alternatives

	Alternative 1 – Proposed Action	Alternative 2 – Additional Wildlife Considerations	Alternative 3 – Additional Environmental Considerations	Alternative 4 – No Action
Proposed new wells	423	423	373	55
Wellsite surface disturbance (acres)	761	761	671	99
New road disturbance (acres)	461	461	407	60
Total Disturbance	**1,222**	**1,222**	**1,078**	**159**
Proposed new roads (miles)	127	127	112	17
Water use (acre-feet)	140	140	135	18
Proposed new compressor stations	1	1	1	0

2.3 ALTERNATIVE 3 – ADDITIONAL ENVIRONMENTAL CONSIDERATIONS

This alternative was developed to address recent updates in (critical) mule deer winter range boundaries for the area as developed by the Utah Division of Wildlife Resources (UDWR) and to address recent changes in wilderness inventory designation (see Section 1.6.1; see Map 2-2). This alternative would incorporate the same operational components as the Proposed Action and the same environmental considerations as Alternative 2 – Additional Wildlife Considerations (see Section 2.2.1), except those in Sections 2.2.1.4.1, Deer; 2.2.1.4.2, Sage Grouse; and 2.2.1.4.3, Raptors. Under Alternative 3 – Additional Environmental Considerations, the additional BMPs that could be applied would result in the expansion of the mule deer winter range boundary as depicted on Map 2-6 and the application of USFWS recommended guidelines for raptor protection.

Under this alternative, 50 fewer wells would be drilled over the life of the project when compared to the Proposed Action and Alternative 2 (i.e., only 373 wells). The wells eliminated from drilling would include 15 wells in the White River inventory area, 26 wells in the Utah Wilderness Coalition (UWC) Lower Bitter Creek proposed wilderness unit that the BLM has determined likely to have wilderness characteristics, and 9 wells in the UWC White River proposed wilderness unit that the BLM has determined likely to have wilderness characteristics (see Maps 2-2 and 2-8). In addition to raptor and sage grouse timing limitations and surface use restrictions, approximately 128 of the proposed wells on BLM-administered lands would be located on mule deer winter range that should be afforded protection through timing restrictions.

2.3.1 ADDITIONAL BMPS

This alternative incorporates the same environmental considerations presented in Alternative 2, Sections 2.2.1.1, Water Resources; 2.2.1.2, Soils/Riparian; 2.2.1.3, Vegetation; 2.2.1.4, Wildlife; 2.2.1.5, Special Status Species; and 2.2.1.6, Recreation/Visual Resources. The following SOP/BMPs are also included under this alternative.

2.3.1.1 MULE DEER

To protect wintering mule deer, no surface disturbing, drilling, or completion activities should be allowed from November 15 through April 15 on BLM-administered lands identified in the BCRMP as crucial deer winter range (BLM 1984). The standard lease terms (60-day rule) would still apply on BLM-administered lands identified by the UDWR as critical deer winter range outside of BCRMP crucial deer winter range (see lands identified on Map 2-6 as UDWR Critical Big Game Winter Range). Exceptions to this limitation in any year should be requested of the BLM in writing. This restriction does not apply to maintenance and operation of producing wells. The number of actual visits by personnel needed to monitor well operations should be minimized during this period.

Mitigation or enhancement of 1.5 acres for every acre of surface disturbance within mule deer browse habitat (e.g., sagebrush, four-winged saltbush, winterfat, etc.) within this winter range area would be required.

2.3.1.2 SAGE GROUSE

Sage grouse BMPs are as follows:

- If an active lek site is documented prior to ground disturbance, a permanent avoidance area should be established within 400 yards of the lek (Hemker 1997) and should include avoiding the development of power lines, roads, and fences.
- No new facilities of any kind should be constructed within 0.6 mile (1 km) of leks, to minimize disturbance during the breeding season.
- Human activities of any kind in view of or within 0.3 mile (0.5 km) of leks should be minimized during early morning and late evening, when sage grouse are on or near leks (Connelly et al. 2000).
- No power lines or electrical transmission lines that provide perch sites for raptors should be built within 2 miles (3 km) of sage grouse habitat. Transmission lines should be buried and power poles should be modified to prevent their use as raptor perches (Connelly et al. 2000).

2.3.1.3 RAPTORS

Raptor BMPs are as follows:

- The USFWS raptor nesting and spatial buffer guidelines should be used to minimize the effects of ground-disturbing activities on raptors nesting within the project area. The spatial and seasonal buffers are shown below in Table 2-7 (USFWS 2002).
- The USFWS guidelines for avoiding and minimizing impacts to raptors should be used. Detailed descriptions of the 2002 USFWS raptor guidelines are contained in Appendix E.
- No surface occupancy should be allowed within the recommended nesting constraint distances unless proposed activities are topographically concealed from the nest, or unless ANSs are constructed. If ANS mitigation is used, raptor ANSs should be constructed to allow raptors to switch from natural nesting sites to artificial ones. The ANSs should be in place at least two years prior to any development occurring within 1/4 mile of a natural nest to allow the raptors the opportunity to accept or reject the new structure. A site-specific analysis should be completed to determine if terrain features adequately protect the nest site from proposed ground-disturbing activity.

Table 2-7. USFWS Nesting Periods and Recommended Buffers for Raptors in Utah

Species	Spatial Buffer (miles)	Seasonal Buffer
Bald eagle	1.00	January 1 – August 31
Golden eagle	0.50	January 1 – August 31
Ferruginous hawk	0.50	March 1 – August 1
Peregrine falcon	1.00	February 1 – August 31
Burrowing owl	0.25	March 1 – August 31
Swainson's hawk	0.50	March 1 – August 31
Northern goshawk	0.50	March 1 – August 15
Short-eared owl	0.25	March 1 – August 1
Prairie falcon	0.25	April 1 – August 31
Merlin	0.50	April 1 – August 31
American kestrel	N/A[1]	April 1 – August 15
Turkey vulture	0.50	May 1 – August 15
Cooper's hawk	0.50	March 15 – August 31
Sharp-shinned hawk	0.50	March 15 – August 31
Northern harrier	0.50	April 1 – August 15
Red-tailed hawk	0.50	March 15 – August 15
Great horned owl	0.25	December 1 – September 31
Long-eared owl	0.25	February 1 – August 15
Mexican spotted owl	0.50	March 1 – August 31

[1] Due to apparent high population densities and ability to adapt to human activity, a spatial buffer is not currently considered necessary for maintenance of American kestrel populations.

Source: USFWS 2002.

2.3.1.4 WILDERNESS CHARACTERISTICS

To protect wilderness characteristics, the construction, drilling, and completion of wells and the building of access roads within the White River inventory area and the UWC's Lower Bitter Creek and White River proposed wilderness units that are likely to have wilderness characteristics should not be allowed (see Map 2-8).

2.3.2 PRIMARY ELEMENTS COMPOSING ALTERNATIVE 3 – ADDITIONAL ENVIRONMENTAL CONSIDERATIONS

The primary elements of this alternative are the same as Alternative 2 – Additional Wildlife Considerations, except for the aforementioned size change of the mule deer winter range protection area, changes in sage grouse protection measures, changes in raptor protection measures, wilderness characteristics protection, and an increase in wells subject to timing restrictions.

2.3.3 WORKFORCE AND CONSTRUCTION RESOURCE REQUIREMENTS

The workforce and construction resources required for Alternative 3 would be similar in type to those described for Alternative 2 (see Section 2.2.3). However, the workforce and construction materials requirements would be slightly less because of the reduction in the number of wells constructed. All other construction, operation, and reclamation activities, as identified under the Proposed Action, would also occur under this alternative.

2.4 ALTERNATIVE 4 – NO ACTION

Under the No Action Alternative, the Proposed Action would not be implemented, and current land use practices, including existing oil and gas production, would be continued (see Map 2-3). Historically, since the Book Cliffs RMP ROD was signed in 1985, wells in the area have been drilled at an average rate of 3.5 wells per year (BLM 2002a). At this rate, approximately 35–70 wells would be drilled during the 10–20-year period analyzed in this document. For the purpose of analysis, it is assumed that 55 wells would be drilled under this alternative.

2.4.1 PRIMARY ELEMENTS COMPOSING THIS ALTERNATIVE

The primary elements composing this alternative are very similar to those of Alternative 1 – Proposed Action. The same construction, operational, and reclamation components would occur as described for Alternative 1, but at a proportionately lower rate. It is assumed that the 55 wells would be drilled in the vicinity of existing production in the area. Approximately 17 miles of road would be needed for access. Surface disturbances would total 60 acres. Table 2-6 shows a comparison of this alternative with Alternatives 1, 2 and 3.

2.4.2 WORKFORCE AND CONSTRUCTION RESOURCE REQUIREMENTS

The requirements for constructing the facilities in this alternative are very similar to those identified for Alternative 1. However, due to the substantially lower number of wells drilled under this alternative, there are fewer requirements for a workforce and for construction materials. All other construction, operation, and reclamation activities, as identified under the Proposed Action, would also occur under this alternative, though at a greatly reduced frequency.

2.5 ALTERNATIVES CONSIDERED BUT NOT EVALUATED IN DETAIL

Several additional project alternatives were initially considered in response to issues raised during scoping. Those that were eliminated from detailed analysis in the EIS, for various reasons, are briefly described in this section, as is the rationale for their exclusion.

2.5.1 MAXIMUM DEVELOPMENT

A maximum development of 969 wells was analyzed as the Proposed Action in the EA initially prepared for this project. This development scenario was originally based on 80-acre spacing. The spacing, though somewhat unrealistic, was used to analyze the maximum environmental

impacts that could potentially be associated with the RDG project. In the FONSI for the EA, the 80-acre spacing was reduced to 160-acre spacing in critical deer winter range. In keeping with the decision to minimize environmental impacts for the analysis presented in this EIS, the BLM and RDG operators felt that realistic economic development could be attained at the level proposed in the Proposed Action (i.e., maximum development of 423 wells).

Development beyond the 423 wells proposed could not be permitted under this EIS, as such an alternative would increase impacts rather than minimize them. Additional environmental analysis under NEPA would be required to evaluate such a proposal.

2.5.2 NO DEVELOPMENT

A "no development" alternative, which denies all APDs and ROWs on federal lands, was considered but rejected for several reasons:

- There are areas of private and state land in the RDG Project Area, and development could occur on these lands regardless of any decision to deny development on federal lands.
- The BLM cannot deny access to private holdings across federal lands. The BLM's policy concerning access to oil and gas reserves on non-federal lands is contained in BLM manual 2800.06D, release 2-224 (May 15, 1985), which directs the BLM to allow access to non-federally owned lands surrounded by public lands managed under FLPMA as necessary to secure to the owner the reasonable use and enjoyment thereof. Ingress and egress need not necessarily require the highest degree of access, but rather a degree of access commensurate with the reasonable use and enjoyment of the land. The access necessary for the reasonable use and enjoyment of non-federal land cannot be denied so long as the landowner complies with BLM rules and regulations on federal surface.
- The denial of all development on federal lands could lead to the drainage of federal reserves from wells on adjacent state and private surface. A drainage stipulation designed to protect the federal mineral estate is included in the lease term contractual agreements for all leased lands in the RDG Project Area. Since private and state land developments are anticipated, some well development on BLM administered lands would occur.
- The denial of the right to develop a valid lease could violate the lessees' contractual rights. An oil and gas lease grants the lessee the "right and privilege to drill from, mine, extract, remove, and dispose of all oil and gas deposits" in the leased lands, subject to the terms and conditions incorporated in the lease. The BLM cannot directly or indirectly prohibit, altogether, the development of the lease. To deny all activity would constitute a breach of contract of the lessees' rights to conduct development activities on the leased lands. Only Congress has the authority to grant a complete denial.

2.5.3 DIRECTIONAL DRILLING

Directionally drilling the entire field was eliminated from detailed analysis because several technical and economic aspects limit the feasibility of directional drilling and, thus, the feasibility of this alternative:

- First, the Wasatch and Mesaverde Formations, which are the primary target formations, occur at relatively shallow depths (the top of the Wasatch Formation can be as shallow as 2,000 feet) within the Project Area. These formations consist of randomly stacked lenticular sand lenses that were created by meandering streambeds. The greatest potential for intersecting these sand lenses is to drill vertically through the target formations within a spacing unit. To meet the technical and economic viability needs of the proponent to drill a directional well that could be turned to drill vertically through the Wasatch Formation in an adjacent 40-acre spacing unit, the vertical depth to the top of the target formation would need to be 3,500 feet. In the Project Area, enough vertical distance (± 3,500 feet) from the surface to the target formation exists only in limited areas within the RDG Project Area. It mainly occurs at high points in northwest portion of the RDG Project Area (e.g., T11S, R23E).
- Secondly, potential target formations that exist below the Mesaverde Formation are essentially untested within the Project Area. It has yet to be determined if a vertical well can even be economically drilled to a target formation below the Mesaverde Formation.
- In addition to the above technical impediments, directional wells are much more expensive to drill. They require larger rigs, larger drill pads, and larger reserve pits; take much longer to drill; must be drilled with mud rather than air; and require specialized tools, surveys and expertise.

2.5.4 SUSPENSION OF OPERATION

An alternative to hold certain leases in suspension for an extended period in the interest of conservation was considered. However, this alternative would merely delay the effects of development by the period of the suspension. Such a delay would not reduce the environmental impact of the Proposed Action. Thus, this alternative was not independently analyzed in detail.

2.5.5 EXCHANGE OF LEASES

The alternative of exchanging leases for other federal leases was also considered, but not analyzed in detail. Several variations of this alternative involve exchanging assets inside the UWC proposed areas for assets on other public lands in Utah, other states, or federal holdings offshore. There are several reasons why this alternative is not analyzed in detail in this document:

- If an exchange were to occur, the impacts within the UWC proposed areas would be the same as the No Action Alternative because no drilling would be performed under current leases. The No Action Alternative is analyzed in detail. Moreover, it would be impossible to analyze the impacts of exploration and development at other sites involved in an exchange because the identity of such sites is speculative.
- In addition, under existing exchange authority, the FLPMA (43 U.S.C. 1716(b)), exchanged assets must be located in the same state. If lessees were only interested in exchanging for assets located outside Utah, legislation would be required to affect an exchange. FLPMA also requires that such exchanges must be for equal value assets. This means that the value of leases within the UWC proposed areas would need to be established through an appraisal process or a determination of "sunk costs" (acquisition,

exploration, administrative or other similar costs), and the assets proposed for exchange would need to be similarly appraised. Such an appraisal would be extremely difficult to achieve since the assumed value of these leases is highly speculative.

2.6 COMPARISON OF ALTERNATIVES

For a comparison of alternatives, see Table 2-6.

2.7 SUMMARY ALTERNATIVES AND IMPACTS

The following table (Table 2-8) summarizes the alternatives and the likely environmental consequences of each alternative. See Chapter 4 for details.

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Table 2-8. Summary of Alternatives and Impacts

Potential Impact	Alternative 1 – Proposed Action	Alternative 2 – Additional Wildlife Considerations	Alternative 3 – Additional Environmental Considerations	Alternative 4 – No Action
GEOLOGY AND MINERALS				
Removal of natural gas	448.3 bcf	448.3 bcf	395.3 bcf	58.3 bcf
Conflicts with existing gas and oil leases	None	None	None	None
WATER RESOURCES				
Effects on groundwater	Groundwater quality could be impacted within shallow alluvial aquifers and, to a lesser extent, within deeper aquifers via infiltration and migration of drilling muds, upward migration of saline water and hydraulic fracturing fluids along natural fractures, and downward migration of drilling fluids in unlined pits. Proper casing and cementing should protect aquifers.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Effects on surface water	Minimal impacts to surface water resources. All water used during gas exploration and development will be disposed of in an EPA-approved injection well.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

Table 2-8. Summary of Alternatives and Impacts

Potential Impact	Alternative 1 – Proposed Action	Alternative 2 – Additional Wildlife Considerations	Alternative 3 – Additional Environmental Considerations	Alternative 4 – No Action
AIR QUALITY				
Effects caused by construction	No violations of state or federal regulations and standards are expected to occur. Dust effects would be local, and fugitive dust would be controlled by water and chemical surfactant. Vehicle emissions would decrease rapidly beyond the construction area, and maximum air pollution levels would be below state and NAAQS limits.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Gas compressor effects	No violations of state or federal regulations and standards are expected to occur.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Regional haze effects	Cumulative visibility impacts are expected to be below PSD visibility limits for Arches and Canyonlands National Parks and Flat Top Wilderness Area.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

Table 2-8. Summary of Alternatives and Impacts

Potential Impact	Alternative 1 – Proposed Action	Alternative 2 – Additional Wildlife Considerations	Alternative 3 – Additional Environmental Considerations	Alternative 4 – No Action
SOILS/WATERSHEDS/FLOODPLAINS				
Effects on soil properties	Soil compaction and exposure, loss of topsoil productivity, slope steepening, increased susceptibility to wind and water erosion, potential slope failure, and increased sedimentation. Total produced sediment anticipated per well for 24 years would 124 tons. The proposed 423 wells would produce 52,367 tons of sediment over the life of the project.	Same as Alternative 1, except that anticipated sedimentation per well for 24 years would be 84 tons. Total sediment produced for 423 wells would be 35,765 tons.	Same as Alternative 2, except that total sediment produced for 373 wells would be 31,537 tons.	Only 2–5 wells per year would be drilled. Impacts to soil would be similar to Alternative 1, but the total amount of disturbance would be greatly reduced. Total produced sediment per well for 24 years would be 123 tons.
Construction on slopes greater than 40%	Increased risk of losing, mixing, or burying topsoil; increased difficulty in stabilizing cut slopes; increased difficulty in restoring slope contours during reclamation.	There would be no surface disturbance on slopes greater than 40%.	Same as Alternative 2.	Increased risk of losing, mixing, or burying topsoil; increased difficulty in stabilizing cut slopes; increased difficulty in restoring slope contours during reclamation.

Table 2-8. Summary of Alternatives and Impacts

Potential Impact	Alternative 1 – Proposed Action	Alternative 2 – Additional Wildlife Considerations	Alternative 3 – Additional Environmental Considerations	Alternative 4 – No Action
VEGETATION				
Disturbance of vegetation	The removal of vegetation on 1,222 acres. Of the 1,222 acres, short-term vegetation loss would be limited to 355 acres; long-term losses would include 867 acres. Estimated time for recovery to pre-disturbance vegetation productivity is 30-40 years for sagebrush/grass and 75-150 years for pinyon-juniper. Poor soil productivity and low annual precipitation could lead to increased time for site stabilization and a potential decrease in long-term vegetative productivity.	Same as Alternative 1.	The removal of vegetation on 1,078 acres. Of the 1,078 acres, short-term vegetation loss would be limited to 313 acres; long-term losses would include 765 acres. Estimated time for recovery to pre-disturbance vegetation productivity is 30-40 years for sagebrush/grass and 75-150 years for pinyon-juniper. Poor soil productivity and low annual precipitation could lead to increased time for site stabilization and a potential decrease in long-term vegetative productivity.	The removal of vegetation on 14.4 acres per year. Of the 14.4 acres, approximately 4.2 acres per year would have short-term disturbances; 10.2 acres would be subject to long-term disturbances. Poor soil productivity and low annual precipitation could lead to increased time for site stabilization and a potential decrease in long-term vegetative productivity.
RIPARIAN AREAS				
Effects on the riparian community	Under this alternative, 3.50 acres of riparian area could be disturbed by construction. Long-term disturbance of riparian vegetation could allow the establishment of noxious weeds, resulting in a decrease in native vegetation diversity and loss of suitable habitat.	All delineated riparian areas would be avoided, and there would be no impact to riparian resources.	Same as Alternative 2.	Under this alternative, 9.09 acres of riparian habitat could be disturbed, including 5.60 acres along Bitter Creek. Loss of vegetation along Bitter Creek could produce decreases in water quality, bank failure and widening, and sedimentation.

Table 2-8. Summary of Alternatives and Impacts

Potential Impact	Alternative 1 – Proposed Action	Alternative 2 – Additional Wildlife Considerations	Alternative 3 – Additional Environmental Considerations	Alternative 4 – No Action
WILDLIFE				
Effects on mule deer	On state and BLM-managed lands, 158.5 acres of crucial deer winter range would be lost for the life of the project. Within the UDWR identified critical deer habitat (which includes BLM-designated habitat), 414 acres of crucial deer winter range would be lost for the life of the project. Indirect impacts would include loss in habitat value from fragmentation, animal displacement, increased human presence, increased vehicle-related deer mortality, improved hunter access, increased disturbance and harassment by noise, shooting, poaching, and OHV use.	Impacts similar to those for Alternative 1, except for the environmental considerations designed to protect wintering mule deer (no disturbing, drilling, or completion activities from November 15 through April 15) in BLM-designated crucial deer winter habitat. Direct impacts would be offset by enhancement of 1.5 acres of land for every acre of browse habitat disturbed within BLM crucial winter habitat.	Impacts similar to those for Alternative 1, except that environmental considerations would be expanded to apply to the UDWR identified critical winter range. Direct impacts would be offset by enhancement of 1.5 acres of land for every acre of browse habitat disturbed on BLM managed lands within the UDWR identified critical winter range.	Similar to Alternative 1, but that impacts would be at a much slower rate and over a longer time period. There would not be commitments to mitigation.
Effects on elk	Increased disturbance to individuals from well and road development, habitat fragmentation, and effects similar to those for mule deer.	Effect similar to Alternative 1, except that protection measures for big game would reduce the effects.	Effect similar to Alternative 1, except that effects would be reduced within the UDWR identified critical winter range.	Similar to Alternative 1, but that impacts would be at a much slower rate and over a longer time period. There would not be commitments to mitigation. Wells could be placed within the Bitter Creek floodplain.

Table 2-8. Summary of Alternatives and Impacts

Potential Impact	Alternative 1 – Proposed Action	Alternative 2 – Additional Wildlife Considerations	Alternative 3 – Additional Environmental Considerations	Alternative 4 – No Action
Effects on pronghorn	Project activities in proximity to the Asphalt Wash guzzler and its permanent water sources would have adverse impacts to the pronghorn population. Indirect impacts would include habitat fragmentation and increased human access into the area.	Minimal direct impacts to pronghorn. Environmental considerations would prohibit new construction within .25 mile of Asphalt Wash, the flowing wells within Asphalt Wash, and the Center Fork of Asphalt Wash. Indirect impacts would include habitat loss from fragmentation, and human intrusion into the area.	Same as Alternative 2.	Similar to Alternative 1, but that impacts would be at a much slower rate and over a longer time period. There would not be commitments to mitigation. Wells could be placed within the Bitter Creek floodplain.
Effects on upland game, small mammals, and furbearers/ predators	Loss of breeding and nesting habitat, and increased hunting pressure on upland game. Alternative 1 would have little or no effect on furbearers or predators found within the project area. Small mammals may be displaced through the loss of habitat and susceptible to predation, but the effects are not expected to be substantial or long-term.	Same as Alternative 1.	Similar to Alternative 1, except that the elimination of 50 wells from areas possessing wilderness characteristics would reduce the habitat impacts to these species.	Similar to Alternative 1, but without commitments to mitigation. Wells could be placed within the Bitter Creek floodplain.

Table 2-8. Summary of Alternatives and Impacts

Potential Impact	Alternative 1 – Proposed Action	Alternative 2 – Additional Wildlife Considerations	Alternative 3 – Additional Environmental Considerations	Alternative 4 – No Action
Effects on raptors	Up to 19 nests could be affected by Alternative 1. Wellsite construction or road development could result in nest abandonment, prevent existing nests from being used in the future, fragment raptor habitat, and eliminate potential future nesting opportunities. Loss of habitat for base prey would directly affect birds foraging in the project area. Habitat enhancement could improve raptor foraging habitat.	Similar impacts as for Alternative 1, except that BLM-approved environmental considerations would prevent construction within nesting site constraint areas during breeding and nesting periods, which would reduce nest abandonment. Some species would be reduced through habitat fragmentation. Habitat enhancement could improve raptor foraging habitat.	Same as Alternative 2, except that the elimination of 50 wells in areas possessing wilderness characteristics and implementation of USFWS raptor guidelines would further reduce impacts to breeding and nesting raptors.	Similar to Alternative 1, but that impacts would be at a much slower rate and over a longer time period. There would not be commitments to mitigation. Wells could be placed within the Bitter Creek floodplain.
Effects on waterfowl, shorebirds, neotropical migratory birds, and songbirds	1,222 acres of surface disturbance would result in the loss of habitat and nesting sites. Increased traffic could produce more vehicle collisions with birds.	Same as Alternative 1.	1,078 acres of surface disturbance would result in the loss of habitat and nesting sites. Increased traffic could produce more vehicle collisions with birds.	Similar to Alternative 1, but without commitments to mitigation. Wells could be placed within the Bitter Creek floodplain.
Effects on reptiles and amphibians	Impacts would be minimal, but access roads and increased traffic could result in road kills of snakes.	Same as Alternative 1.	Same as Alternative 1.	Similar to Alternative 1, but without commitments to mitigation. Wells could be placed within the Bitter Creek floodplain.

Table 2-8. Summary of Alternatives and Impacts

Potential Impact	Alternative 1 – Proposed Action	Alternative 2 – Additional Wildlife Considerations	Alternative 3 – Additional Environmental Considerations	Alternative 4 – No Action
SPECIAL STATUS SPECIES				
Effects on special status species	143 wells could be placed within potential habitat of Graham beardtongue and White River beardtongue. Road and pipeline development would create a fragmented habitat, impacting seed dispersal and species distribution. Suitable habitat would be lost in the well and road sites. Special status raptor species and neotropical migratory songbird breeding and nesting activities may be affected by construction. Impacts to breeding sage grouse would be partially mitigated by the BMPs.	Same as Alternative 1, except that implementation of BLM-approved raptor spatial and timing constraints would reduce impacts to breeding and nesting raptors. Impacts to sage grouse would be reduced through implementation of more restrictive mitigation measures incorporated into Alternative 2.	Same as Alternative 2, except that the elimination of 50 wells in areas possessing wilderness characteristics and implementation of USFWS raptor guidelines would further reduce impacts to breeding and nesting raptors.	This alternative poses the greatest potential for disturbance, with 2–4 times the number of wells proposed in Alternatives 1 and 2. Fragmentation of habitat by roads, wells, and pipelines. Potential for invasive weed species, loss of potential habitat would be greatest under this alternative.

Table 2-8. Summary of Alternatives and Impacts

Potential Impact	Alternative 1 – Proposed Action	Alternative 2 – Additional Wildlife Considerations	Alternative 3 – Additional Environmental Considerations	Alternative 4 – No Action
CULTURAL RESOURCES				
Effects on cultural resources	50–216 sites could exist within the project area. Impacts to these cultural sites and structures would be mitigated on a site-specific basis as part of the APD NEPA process and related Section 106 compliance work. Adverse effects would be mitigated through a combination of research, avoidance, preservation in place, and interpretation.	Same as Alternative 1.	Same as Alternative 1, except that the potential impacts would be reduced, based on fewer wells being drilled and fewer access roads.	Same as Alternative 1, except that the scope and scale of impacts would be reduced, based on fewer wells being drilled.
PALEONTOLOGICAL RESOURCES				
Effects on paleontological resources	Fossil-bearing geological formations extend into the proposed Project Area. Any adverse effects to the resource would be minimized by the project Paleontological Treatment Plan stipulations and BLM resource management guidelines.	Same as Alternative 1.	Same as Alternative 1, except that the scope and scale of impacts would be reduced, based on fewer wells being drilled and fewer access roads being constructed.	Impacts would be the same as Alternative 1, but the scope and scale would be proportionally reduced based on fewer wells being drilled with associated access roads, pipelines, and facilities.

Table 2-8. Summary of Alternatives and Impacts

Potential Impact	Alternative 1 – Proposed Action	Alternative 2 – Additional Wildlife Considerations	Alternative 3 – Additional Environmental Considerations	Alternative 4 – No Action
LIVESTOCK MANAGEMENT				
Effects on livestock management	Direct short-term removal of 355 acres and long-term removal of vegetation on 867 acres would result in the loss of 86 AUMs across the project area for the duration of the project, plus an additional 30–40 years, until the disturbed areas are revegetated. Road construction would increase the potential for vehicular collisions and disturbance of livestock.	Same as Alternative 1.	Direct short-term removal of 313 acres and long-term removal of vegetation on 765 acres would result in the loss of 76 AUMs across the project area for the duration of the project, plus an additional 30– 40 years, until the disturbed areas are revegetated. Road construction would increase the potential for vehicular collisions and disturbance of livestock.	Direct loss of 14.4 acres per year, with approximately 10.2 acres lost for the long term, resulting in the loss of one (1) AUM each year. The potential for vehicle and livestock collisions would remain at existing levels.
RECREATION				
Effects on recreational opportunities	Road construction would allow hunters and OHV users to access more of the project area. The increase in drilling and related truck traffic would deter some hunters. Hikers would encounter roads, facilities, and service traffic 1.5 miles beyond the Goblin City overlook. Hikers might also use the road network to access remote hiking opportunities. Pipelines greater than 4 inches in diameter would pose an	Same as Alternative 1, except that construction would be restricted between May 15 and June 30 within 5 miles of the Goblin City Overlook.	Same as Alternative 2, except that the preservation of wilderness characteristics within the White River inventory unit and the UWC proposed wilderness units would maintain the existing recreational opportunities within these areas.	Access to the area would not change. Hunters, OHV users, and hikers would continue to use the existing road network.

Table 2-8. Summary of Alternatives and Impacts

Potential Impact	Alternative 1 – Proposed Action	Alternative 2 – Additional Wildlife Considerations	Alternative 3 – Additional Environmental Considerations	Alternative 4 – No Action
Effects on recreational opportunities, CONT.	obstacle to vehicles accessing the project area.			
VISUAL RESOURCES				
Effects on visual resources	11 well pads and 16 road segments would be located in areas visible from the Goblin City view area. Well pads, wells, and associated facilities would be visible to hikers, hunters, and OHV users throughout the project area, which is consistent with the VRM Class IV visual objectives for the project area. Short-term impacts would not affect the VRM Class II area, but side-cutting on hillsides, drilling derricks, and the appearance of roads, well pads, dust plumes, and equipment exhaust would diminish the remote and natural experience as seen from the Goblin City view area.	Same as Alternative 1, except that construction would be restricted between May 15 and June 30 within 5 miles of the Goblin City Overlook.	Same as Alternative 2, except that the preservation of wilderness characteristics within the White River inventory unit and the UWC proposed wilderness units would reduce visual impacts within the project area.	No changes in access or the visual environment would occur.

Table 2-8. Summary of Alternatives and Impacts

Potential Impact	Alternative 1 – Proposed Action	Alternative 2 – Additional Wildlife Considerations	Alternative 3 – Additional Environmental Considerations	Alternative 4 – No Action
WILDERNESS CHARACTERISTICS				
Effects on wilderness characteristics	Wilderness characteristics would be lost within the White River inventory unit and the UWC proposed wilderness units that the BLM has determined likely have wilderness characteristics.	Same as Alternative 1.	The wilderness characteristics would be preserved within the White River inventory unit and the UWC proposed wilderness units that the BLM has determined likely have wilderness characteristics.	Wells would continue to be drilled at the past rate of 2–5 wells per year. Several wells would probably be drilled within the White River inventory unit and the UWC proposed wilderness units. Construction-produced noise, dust, flaring, roads, traffic, and well pads would be evident and would diminish wilderness characteristics.
SOCIOECONOMICS				
Effects on socioeconomics	There would be an increase of 89–178 jobs within the area over the lifetime of the project, approximately equivalent to $3,560,000 to $7,120,000 in wages annually. Royalty revenues would be approximately $295 million over the next 40 years.	Similar to Alternative 1. No long-term impacts to populations in Uintah and Duchesne Counties. Royalty revenues would be the same as Alternative 1.	Similar to Alternative 1. No long-term impacts to populations in Uintah and Duchesne Counties. Royalty revenues would be approximately $260 million over the life of the project.	No long-term impacts to populations in Uintah and Duchesne Counties. Employment effects would be less than Alternative 1. Given current development trend, royalty revenues would be approximately $38 million over the 40 years.

Table 2-8. Summary of Alternatives and Impacts

Potential Impact	Alternative 1 – Proposed Action	Alternative 2 – Additional Wildlife Considerations	Alternative 3 – Additional Environmental Considerations	Alternative 4 – No Action
NOISE				
Noise effects	Noise would be perceptible from the Goblin City view area.	Noise would be perceptible from the Goblin City view area, but not during peak river floating season. Additional construction restrictions would be in effect between November 15 and April 15.	Same as Alternative 2.	No change in existing noise levels within the project area would occur.

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